Attorney's Docket No. SPO-611 MAIL STOP AMENDMENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:) Group Art Unit: 1714
SATOH; HIMENO; KAZAMA	Examiner: Tae H. Yoon
Serial No.: 10/088,347)))
Filed: March 18, 2002	

For: PHOTO-CURABLE REPARATIVE MATERIAL

FOR DENTAL USE

APPENDIX A

Please amend the claims as indicated according to 37 C.F.R. \$ 1.121 concerning a manner for making claim amendments.

- 1. (Original) A photocurable dental restorative comprising (i) 100 parts by weight of a polymerizable monomer, (ii) 0.01 to 5 parts by weight of a photopolymerization initiator of acylphosphine oxide, and (iii) 200 to 1900 parts by weight of an inorganic filler, wherein the inorganic filler (iii) is a mixed filler of:
- (A) irregular-shaped inorganic particles having an average particle size of not smaller than 0.1 μm but smaller than 1 μm ;
- (B) spherical inorganic particles having an average primary particle size of not smaller than 0.1 μm but not larger than 5 $\mu m \, ;$ and

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(C) fine inorganic particles having an average primary particle size of not larger than 0.1 $\mu\text{m}\text{;}$

①
$$mA/(mB + mC) = 0.2 \text{ to } 3$$

$$@ mB/(mB + mC) = 0.5 \text{ to } 0.99$$

$$(mB + mC) = 0.01 \text{ to } 0.5$$

where mA, mB and mC are masses of the inorganic particles (A) to (C).

2. (Original) A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) is obtained by so blending the inorganic particles (A) to (C) as to satisfy the following mass ratios ①' to ③';

$$\bigcirc$$
' mA/(mB + mC) = 0.4 to 2.3

②'
$$mB/(mB + mC) = 0.6 \text{ to } 0.9$$

$$3' \text{ mC/(mB + mC)} = 0.1 \text{ to } 0.4.$$

3. (Original) A photocurable dental restorative according to claim 1, wherein in said mixed filler (iii), a maximum size of aggregates of primary particles of the spherical inorganic

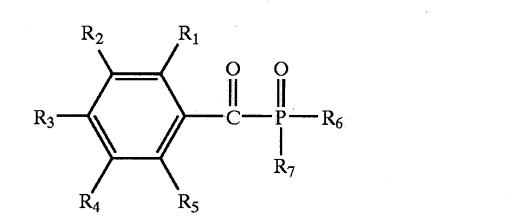
particles (B) and a maximum size of aggregates of primary particles of the fine inorganic particles (C) are not larger than 20 μ m, respectively, and a total amount of the aggregates thereof is not larger than 20% by volume of the whole mixed filler (iii).

- 4. (Original) A photocurable dental restorative according to claim 1, wherein said spherical inorganic particles (B) have an average primary particle size of not larger than 1 μm .
- 5. (Original) A photocurable dental restorative according to claim 1, wherein said fine inorganic particles (C) have an average primary particle size of from 0.05 to 0.09 μm .
- 6. (Original) A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) has a volume of the pores of not smaller than 0.08 μm due to strongly aggregated particles of not larger than 0.1 cc/g.
- 7. (Original) A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) has at least one distribution peak at a position of a particle size of not larger than 0.1 µm and at a position of a particle size of not smaller

(I)

than 0.1 μm but not larger than 1 μm , respectively, on particle size distribution based on the volume of particles, but has no distribution peak at a position of a particle size in excess of 5 μm .

8. (Currently amended) A photocurable dental restorative according to claim 1, wherein said acylphosphine oxide is represented by the following general formula (I) or (II)



(II)

wherein each of R_1 , R_2 , R_3 , R_4 and R_5 is any one of the groups selected from the group consisting of

a hydrogen atom,

a halogen atom,

an alkyl group,

an alkoxy group,

an alkylthio group, and

<u>a substituted or unsubstituted an unsubstituted aryl</u>
group or a substituted aryl group substituted by at least
one group selected from the group consisting of

a halogen atom,

an alkyl group and

an alkoxy group,

and each of R_6 and R_7 is any one of the groups selected from the group consisting of

<u>a substituted or unsubstituted a substituted alkyl</u>

group or a substituted alkyl group <u>substituted by at least</u>

one group selected from the group consisting of

a halogen atom,

an alkyl group and

an alkoxy group,

a substituted or unsubstituted a substituted alkenyl group or a substituted alkenyl group substituted by at least one group selected from the group consisting of

a halogen atom,

an alkyl group and

an alkoxy group, and

a substituted or unsubstituted an unsubstituted aryl group or a substituted aryl group substituted by at least one group selected from the group consisting of

an alkyl group and an alkoxy group.

9. (Original) A photocurable dental restorative according to claim 1, wherein said irregular-shaped inorganic particles (A) are treated for their surfaces with a silane coupling agent represented by the following general formula (III),

$$CH_{2} = CCO \xrightarrow{(CH_{2})_{n}} Si \xrightarrow{(R_{10})_{3-m}} (III)$$

$$CH_{2} = CCO \xrightarrow{(CH_{2})_{n}} Si \xrightarrow{(R_{9})_{m}} (R_{9})_{m}$$

wherein R_8 is a hydrogen atom or a methyl group, R_9 is an alkoxy group, a chlorine atom or an isocyanate group, R_{10} is an alkyl group having 1 to 6 carbon atoms, m is an integer of 2 to 3, and n is an integer of 8 to 20,

and said fine inorganic particles (C) are treated for their surfaces with a silane coupling agent represented by the following general formula (IV),

$$CH_{2} = CCO \xrightarrow{(CH_{2})_{n}} Si \xrightarrow{(R_{13})_{3-m}} (IV)$$

$$CH_{2} = CCO \xrightarrow{(CH_{2})_{n}} Si \xrightarrow{(R_{12})_{m}} (R_{12})_{m}$$

wherein R_{11} is a hydrogen atom or a methyl group, R_{12} is an alkoxy group, a chlorine atom or an isocyanate group, R_{13} is an alkyl group having 1 to 6 carbon atoms, m is an integer of 2 to 3, and n is an integer of 2 to 3.

- 10. (Original) A photocurable dental restorative according to claim 1, wherein an amine compound is contained in an amount of from 0.01 to 5 parts by weight per 100 parts by weight of the polymerizable monomer (i).
- 11. (Original) A method of producing a photocurable dental restorative by preparing an inorganic filler by mixing:
- (A) irregular-shaped inorganic particles having an average particle size of not smaller than 0.1 μm ;
- (B) spherical inorganic particles having an average primary particle size of not smaller than 0.1 μm but not larger than 5 μm ; and
- (C) fine inorganic particles having an average primary particle size of not larger than 0.1 μm ;

so as to satisfy the following mass ratios ${\mathbb O}$ to ${\mathbb O}$:

$$\bigcirc$$
 mA/(mB + mC) = 0.2 to 3

$$@ mB/(mB + mC) = 0.5 to 0.99$$

$$(mB + mC) = 0.01 \text{ to } 0.5$$

where mA, mB and mC are masses of the inorganic particles (A) to (C),

and by mixing 100 parts by weight of a polymerizable monomer, 0.01 to 5 parts by weight of a photopolymerization initiator of

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acylphosphine oxide, and 200 to 1900 parts by weight of said inorganic filler.

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